



# LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA16 | Ladbroke and Southam

**Operational assessment (SV-004-016)**

Sound, noise and vibration

November 2013

ES 3.5.2.16.13

# **LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT**

**Volume 5 | Technical Appendices**

CFA16 | Ladbroke and Southam

**Operational assessment (SV-004-016)**

Sound, noise and vibration

November 2013

ES 3.5.2.16.13



# Department for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

A report prepared for High Speed Two (HS2) Limited.

High Speed Two (HS2) Limited,  
Eland House,  
Bressenden Place,  
London SW1E 5DU

Details of how to obtain further copies are available from HS2 Ltd.

Telephone: 020 7944 4908

General email enquiries: [HS2enquiries@hs2.org.uk](mailto:HS2enquiries@hs2.org.uk)

Website: [www.hs2.org.uk](http://www.hs2.org.uk)

High Speed Two (HS2) Limited has actively considered the needs of blind and partially sighted people in accessing this document. The text will be made available in full on the HS2 website. The text may be freely downloaded and translated by individuals or organisations for conversion into other accessible formats. If you have other needs in this regard please contact High Speed Two (HS2) Limited.



Printed in Great Britain on paper  
containing at least 75% recycled fibre.

## Appendix SV-004-016

|                       |                            |     |
|-----------------------|----------------------------|-----|
| Environmental topic:  | Sound, noise and vibration | SV  |
| Appendix name:        | Operation assessment       | 004 |
| Community forum area: | Ladbroke and Southam       | 016 |

# Contents

|          |  |          |
|----------|--|----------|
| <b>1</b> | <b>Introduction</b>                                    | <b>3</b> |
| 1.1      | Structure of the sound, noise and vibration appendices | 3        |
| 1.2      | Evaluation of impacts and effects                      | 3        |
| <b>2</b> | <b>Scope, assumptions and limitations</b>              | <b>5</b> |
| 2.1      | Regional and local policy guidance                     | 5        |
| 2.2      | Engagement   | 5        |
| 2.3      | Methodology  | 5        |
| 2.4      | Assumptions  | 6        |
| 2.5      | Local limitations                                      | 6        |
| <b>3</b> | <b>Environmental baseline</b>                          | <b>7</b> |
| 3.1      | Existing baseline                                      | 7        |
| 3.2      | Future baseline  | 7        |
| <b>4</b> | <b>Effects arising during operation</b>                | <b>8</b> |
| 4.1      | Introduction   | 8        |
| 4.2      | Avoidance and mitigation measures                      | 8        |
| 4.3      | Quantitative identification of impacts and effects     | 8        |
| 4.4      | Assessment of impacts and effects                      | 20       |

## List of tables

|   |    |
|---|----|
| Table 1: Ground-borne sound and vibration levels, noise and vibration impacts and effects.....  | 10 |
| Table 2: Summary of operational ground-borne noise and vibration impacts.....   | 11 |
| Table 3: Operational airborne sound level, noise impacts and effects.....   | 13 |
| Table 2: Summary of operational airborne noise impacts .....  | 20 |
| Table 5: Direct adverse effects on residential communities and shared areas that are considered significant on a community basis..... | 21 |

# 1 Introduction

## 1.1 Structure of the sound, noise and vibration appendices

- 1.1.1 The sound, noise and vibration appendices comprise four sections. The first of these details the methodology used (Appendix SV-001-000) and relates to the sound, noise and vibration assessment for all community forum areas (CFA).
- 1.1.2 For the Ladbroke and Southam community forum area (CFA16), the other three sections are as follows:
- baseline sound, noise and vibration (Appendix SV-002-016);
  - construction sound, noise and vibration (Appendix SV-003-016); and
  - operational sound, noise and vibration (Appendix SV-004-016) (this appendix).
- 1.1.3 The outcomes of this assessment are summarised in Volume 2: CFA16 Report, Chapter 11 Sound, Noise and Vibration.
- 1.1.4 Maps referred to throughout the sound, noise and vibration appendices are contained in the Volume 5 sound, noise and vibration map book.
- 1.1.5 This appendix presents the likely noise and vibration impacts, effects and significant effects arising from the operation of the Proposed Scheme for the Ladbroke and Southam area on:
- people, primarily where they live ('residential receptors') in terms a) individual dwellings and b) on a wider community basis, including any shared community spaces; and
  - community facilities such as schools, hospitals, places of worship, and also commercial properties such as offices and hotels, collectively described as 'non-residential receptors' and 'quiet areas'.
- 1.1.6 The assessment of likely impacts, effects and significant effects from operational noise and vibration on agricultural, community, ecological or heritage receptors and the assessment of tranquillity are presented in the following documents within Volume 5:
- |                                   |                     |
|-----------------------------------|---------------------|
| • Agriculture, forestry and soils | Appendix AG-001-016 |
| • Community                       | Appendix CM-001-016 |
| • Ecology                         | Appendix EC-005-016 |
| • Heritage                        | Appendix CH-003-016 |
| • Landscape and Visual            | Appendix LV-001-016 |

## 1.2 Evaluation of impacts and effects

- 1.2.1 This appendix provides a quantitative assessment of operational noise and vibration impacts and effects and a qualitative assessment of likely significant effects, based on the impacts and effects identified and other local context information consistent with the scope and methodology defined for the Proposed Scheme.

- 1.2.2 Indirect effects arising from permanent changes in traffic patterns on the existing road and rail networks as a consequence of the Proposed Scheme are also reported in this appendix, where they would occur within the study area as defined in Volume 5 Appendix SV-001-000.
- 1.2.3 Route-wide impacts, effects and significant effects associated with noise or vibration from the operation of the Proposed Scheme are reported in Volume 3.
- 1.2.4 Off-route effects of noise or vibration arising from the operation of the Proposed Scheme, including those likely to arise from permanent changes in traffic patterns on roads or railways outside of the study area for direct effects are reported in Volume 4.
- 1.2.5 In undertaking the assessment of sound, noise and vibration, consistent with EIA Regulations and emerging National Planning Practice Guidance<sup>1</sup> a differentiation between impacts effects, adverse effects and significant effects is made. Further information is provided in Volume 5: Appendix SV001-000.
- 1.2.6 The assessment of impacts has been undertaken at assessment locations that are representative of a number of dwellings or other sensitive receptors. The Assessment Locations employed in this assessment are presented on map series Sv-02 in the CFA16 Volume 5 sound, noise and vibration map book.

---

<sup>1</sup> National Planning Practice Guidance – Noise <http://planningguidance.planningportal.gov.uk>; refer to the table summarising noise exposure hierarchy

## 2 Scope, assumptions and limitations

### 2.1 Regional and local policy guidance

2.1.1 The policy framework for sound, noise and vibration is set out in Volume 1 and in Appendix SV-001-000. As part of the engagement with local authorities through the Planning Forum Sub Group (Acoustics), information regarding any specific local planning guidance in respect of noise and vibration has been requested. Whilst no information has been received for this study area via the Planning Forum Sub Group (Acoustics), the following local policy guidance on noise and vibration has been identified:

- Stratford District Local Plan Review - July 2006,

2.1.2 This guidance has been considered as part of formulating the detailed application of the impact and significance criteria set out in Volume 5: Appendix SV-001-000.

### 2.2 Engagement

2.2.1 Details of engagement on a route-wide basis with the local and county authorities' Environmental Health Practitioners via the Planning Forum Sub Group - Acoustics, is set out in Volume 1, Section 8.

2.2.2 Engagement with communities has been via the Community Forums, as set out in Volume 1. In respect of sound, noise and vibration the following discussions have taken place:

- general discussions in respect of local issues, including possible ways to avoid and mitigate the potential impacts of noise or vibration
- September / October 2012; a specific presentation about sound, noise and vibration with discussion afterwards with one of the project team specialists;
- November / December 2012; specific request for the Community Forum to propose baseline sound monitoring locations;
- January / February 2013; feedback to the Community Forum on any proposed baseline monitoring locations; and
- verbal / written response to questions on sound, noise and vibration.

### 2.3 Methodology

2.3.1 The methodology used for the assessment of airborne sound, ground-borne sound and vibration impacts and the determination of significant effects is defined in the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001-000/1), is clarified in a number of areas by the SMR addendum (Volume 5: Appendix CT-001-000/2). Further information is contained in Volume 5: Appendix SV-001-000.

## 2.4 Assumptions

- 2.4.1 Route-wide assumptions are outlined in Volume 1, Section 8, and are further detailed in Volume 5: Appendix SV-001-000. Local assumptions that apply to the assessment of operational sound noise and vibration within this CFA are set out in Volume 2: Report 16 and below.

### *Maintenance Loops*

- 2.4.2 As part of the Proposed Scheme, there will be the provision of two sets of maintenance loops. These will be constructed near Wormleighton. These maintenance loops will consist of an additional section of track each side of the operational railway which will be provided to ensure the operational efficiency of the railway. The maintenance loops are shown on map series SV-02 in the CFA10 Volume 5 sound, noise and vibration map book.
- 2.4.3 These maintenance loops are primarily provided for the daytime storage of track machines that cannot return to Calvert IMD for operational reasons, but could also be used for the temporary storage of HS2 trains that are required to be removed from operational service.
- 2.4.4 The use of these maintenance loops will be infrequent and the activities most likely to be carried out on these loops will be occasional cleaning and preparation of track machines during the day. It is not expected that these maintenance loops will be in regular operational use and the majority of the servicing of track machines will be carried out at Calvert IMD which is located in study area CFA 13, where more appropriate facilities are proposed to be constructed. As such, due to their infrequent use, it is not expected that the maintenance loops will lead to any significant operational noise impacts.

## 2.5 Local limitations

- 2.5.1 In this area, there are a number of locations where the land or property owners did not permit baseline sound level monitoring to be undertaken at their premises. However, sufficient information has been obtained to undertake the assessment. Further information is provided in Volume 5: Appendix SV-002-016.

## 3 Environmental baseline

### 3.1 Existing baseline

- 3.1.1 Baseline sound level data has been collected at locations representative of the airborne sound-sensitive receptors. The existing and future baseline airborne sound levels derived from these measurements are included within Table 3. Details of the baseline data collection and the methodology are given in Volume 5: Appendix SV-001-000 and specifically for this study area in Volume 5: Appendix SV-002-016.
- 3.1.2 The majority of receptors adjacent to the line of the route are not currently subject to appreciable vibration and therefore vibration at all receptors has been assessed using the absolute vibration criteria as described in Volume 5: Appendix SV-001-000.

### 3.2 Future baseline

- 3.2.1 The assessment is based upon the predicted change in sound levels that result from the Proposed Scheme. The assessment initially considered a reasonable worst case (that would overestimate the change in levels) by assuming that sound levels would not change from the existing baseline year of 2012/2013. Where significant effects were identified on this basis, the effects have been assessed using the baseline year of 2026 to coincide with the proposed start of passenger services. The future baseline is for the sound environment that would exist in 2026 without the Proposed Scheme.

## 4 Effects arising during operation

### 4.1 Introduction

4.1.1 The assessment is reported first for ground-borne sound and vibration and then for airborne sound. Under each of these headings, the results of the quantitative identification of impacts and effects are presented. This is followed by the identification of significant effects and the evidence used to support these conclusions.

4.1.2 The structure of this assessment report is:

- Avoidance and mitigation measures
- Quantitative identification of impact and effects
  - Ground-borne sound and vibration
    - Residential
    - Non-residential
  - Airborne sound
    - Residential
    - Non-residential
- Assessment of impacts and effects
  - Residential receptors: direct effects – dwellings
  - Residential receptors: direct effects – communities
  - Residential receptors: indirect effects
  - Non-residential receptors: direct effects
  - Non-residential receptors: indirect effects
  - Cumulative effects from the proposed scheme and other committed development.

### 4.2 Avoidance and mitigation measures

4.2.1 These are set out in Volume 2: Report 16.

### 4.3 Quantitative identification of impacts and effects

#### Ground-borne sound and vibration

4.3.1 Assessment locations defined for the quantitative assessment of impacts are shown on map series SV-02 in the CFA16 Volume 5 sound, noise and vibration map book.

4.3.2 For each Assessment Location, the assessment results for residential and non-residential receptors are presented in Table 1. Explanation of the information in Table 1 is provided in Appendix SV-001-000, with the following additional notes.

|   |  |
|---|--|
| B   | For non-residential receptors further detail about the type of effect is set out in the text of Volume 5: Appendix SV-001-000.   |
| NA  | Type of effect - Generally no adverse effect   |
| A   | Type of effect - Adverse effect  |
| S   | Type of effect - Significant adverse effect  |
| VDV   | Vibration Dose Value   |
| ~   | The forecast adverse effects are not considered to be significant on a community basis (further information on methodology is provided in Volume 5: Appendix SV-001-000).  |
| ^   | The impact methodology has identified a potential significant effect at this receptor which based upon further qualitative information is not considered to be a likely significant effect. Please refer the end of this Appendix for further information. |
|  | Where the significant effect column is highlighted in pink, then a significant effect is identified at the referenced residential community area, or individual receptor.  |
|  | Yellow denotes a low ground-borne noise impact or a minor ground-borne vibration impact  |
|  | Orange denotes a medium ground-borne noise impact or a moderate ground-borne vibration impact  |
|  | Red denotes a high ground-borne noise impact or a major ground-borne vibration impact  |
|  | Dark red denotes a very high ground-borne noise impact   |

Table 1: Ground-borne sound and vibration levels, noise and vibration impacts and effects

| Assessment location |                        | Impact criteria                                 |   |  |                               | Significance criteria         |                |                  |                 |                      |                |                 | Significant effect |
|---------------------|------------------------|---|---|--|-------------------------------|-------------------------------|----------------|------------------|-----------------|----------------------|----------------|-----------------|--------------------|
|                     |                        | Ground-borne sound level dB L <sub>pASmax</sub> | VDV m/s <sup>1.75</sup> Daytime (07:00 - 23:00) | VDV m/s <sup>1.75</sup> Night time (23:00 – 07:00) | % increase or decrease in VDV | Number of impacts represented | Type of effect | Type of receptor | Receptor design | Existing environment | Unique feature | Combined impact |                    |
| ID                  | Area represented       |   |   |  |                               |                               |                |                  |                 |                      |                |                 |                    |
| 621659              | Bascote Heath, Southam | 15  | 0.04  | 0.02   | -                             | 1                             | NA             | R                | T               | -                    | -              | -               | -                  |
| 621658              | Bascote Heath, Southam | 26  | 0.09  | 0.04   | -                             | 1                             | NA             | R                | T               | -                    | -              | -               | -                  |
| 240636              | Station Road, Southam  | -   | 0.13  | 0.07   | -                             | 1                             | NA             | R                | T               | -                    | -              | -               | -                  |
| 239943              | Banbury Road, Southam  | -   | 0.06  | 0.03   | -                             | 1                             | NA             | R                | T               | -                    | -              | -               | -                  |
| 238281              | Banbury Road, Southam  | -   | 0.09  | 0.04   | -                             | 1                             | NA             | R                | T               | -                    | -              | -               | -                  |

## Impact summary

- 4.3.3 The operational ground-borne noise and vibration impacts identified in Table 1 are summarised in Table 2.

Table 2: Summary of operational ground-borne noise and vibration impacts

|                            | Number of ground-borne sound impacts     |          |       |                         |
|----------------------------|--|----------|-------|-------------------------|
|                            | Low                                      | Medium   | High  | Very High               |
| Residential properties     | o  | o        | o     | o                       |
| Non-residential properties | o  |          | o     |                         |
|                            | Number of ground-borne vibration impacts |          |       |                         |
|                            | Minor                                    | Moderate | Major | Risk of building damage |
| Residential properties     | o  | o        | o     | o                       |

## Airborne sound: direct impacts and effects

- 4.3.4 The direct effects from the operation of the Proposed Scheme as well as any new, amended or altered roads or railway lines, which are identified as part of the scheme, are presented in Table 3.
- 4.3.5 The assessment information, impact criteria and significance criteria for the assessment of the incorporated mitigation case at residential and non-residential receptors are presented in Table 3. The results should be considered in conjunction with the information contained in map series Sv-02 in the CFA16 Volume 5 sound, noise and vibration map book.
- 4.3.6 Explanation of the Table 3 information is provided in Volume 5: Appendix SV001-000, with the following additional notes.



Where the significant effect column is marked, then a significant effect is identified at the referenced group of dwellings, or individual residential or non-residential receptor.

Yellow denotes a minor impact at a residential building – a change is of 3-5 dB

Orange denotes a moderate impact at a residential building – a change is of 5-10 dB

Red denotes a major impact at a residential building – a change is of >10 dB

\* Day -  $L_{pAeq,07:00-23:00}$

\*\* Night -  $L_{pAeq,23:00-07:00}$

\*\*\* Max -  $L_{pAFMax}$  In the Proposed Scheme only column, two values are presented. The first is the value for the HS2 mitigated train and the second is the value for the TSI compliant train. For further information refer to Volume 5: Appendix SV-001-000.

\*\*\*\* Where the Proposed Scheme modifies an existing source, i.e. road or railway realignments, the *Proposed Scheme only* level in the table includes the sound from the modified source. In this situation the *Do something (Opening year baseline + Year 15 traffic)* level has been corrected so as to not double count the sound associated with the road or railway on its new and existing alignment.

A Adverse effect

B For non-residential receptors further detail about the type of effect is set out in the text of Appendix SV-001-000.

CD Committed Development. The value in brackets in the number of impacts represented column is the value with the committed development.

G (G1)Theatres, large auditoria and concert halls, (G2) Sound recording and broadcast studios, (G3) Places of meeting for religious worship, courts, cinemas, lecture theatres, museums and small

auditoria or halls, (G4) Schools, colleges, hospitals, hotels and libraries, and (G5) Offices and general commercial premises

- H High existing ambient sound level. Defined as  $>65\text{dB}\text{L}_{\text{Aeq}, \text{day}}$  and/or  $>55\text{dB}\text{L}_{\text{Aeq}, \text{night}}$
- L Low existing ambient sound level. Defined as  $<42\text{dB}\text{L}_{\text{Aeq}, \text{day}}$  and/or  $<32\text{dB}\text{L}_{\text{Aeq}, \text{night}}$
- LD Landscape receptor
- NA Generally no adverse effect
- NI The receptor is predicted to qualify for mitigation, which shall be provided to the specification defined in the Noise Insulation (Railways and other Guided Rail Systems) Regulations 1996
- R Residential
- RM Residential mooring
- S Significant adverse effect
- U Unacceptable adverse effect
- # A change of 3dB or greater has been identified however, the assessment methodology only defines an impact where the absolute sound level from the Proposed Scheme is greater or equal to 50 dB  $\text{L}_{\text{pAeq}, 23:00 - 07:00}$  during the daytime or 40 dB  $\text{L}_{\text{pAeq}, 07:00 - 23:00}$  at night. At the receptor denoted the absolute level condition is not met and therefore no impact is identified.
- The forecast adverse effects are not considered to be significant on a community basis (further information on methodology is provided in Volume 5: Appendix SV-001-000)..
- \$ A change of 3dB or greater has been identified however, the impact methodology for non-residential receptors includes a screening criteria for G3 building use of 50 dB  $\text{L}_{\text{pAeq}, 07:00-23:00}$ , for G4 building use 55 dB  $\text{L}_{\text{pAeq}, 07:00-23:00}$  and 45 dB  $\text{L}_{\text{pAeq}, 23:00-07:00}$ , for G5 building use 55 dB  $\text{L}_{\text{pAeq}, 07:00-23:00}$ . At the receptor denoted the screening criteria is not met and therefore no impact is identified. Further information is provided in Volume 5: Appendix SV-001-000.
- ^ The impact methodology has either identified an impact at a receptor which based upon further qualitative information does not give rise to a significant effect. Further information is provided at the end of this Appendix.

Table 3: Operational airborne sound level, noise impacts and effects

| Assessment Location |                                 | Impact criteria                           |          |         |                                    |          |         |   |          |        |          | Significance criteria |                               |                  |                 |                      |                | Significant effect |                      |  |
|---------------------|---------------------------------|---|----------|---------|------------------------------------|----------|---------|---|----------|--------|----------|-----------------------|-------------------------------|------------------|-----------------|----------------------|----------------|--------------------|----------------------|--|
| ID                  | Area represented                | Proposed Scheme only<br>(Year 15 traffic) |          |         | Do nothing (Opening year baseline) |          |         | Do something<br>(Opening year baseline + Year 15 traffic + adjustments) |          | Change |          | Type of effect        | Number of impacts represented | Type of receptor | Receptor design | Existing environment | Unique feature | Combined impact    | Mitigation of effect |  |
|                     |                                 | Day *                                     | Night ** | Max *** | Day *                              | Night ** | Max *** | Day *   | Night ** | Day *  | Night ** |                       |                               |                  |                 |                      |                |                    |                      |  |
| 231410              | Lower Farm, Long Itchington     | 52  | 43       | 70/73   | 51                                 | 41       | 54      | 52  | 43       | 2      | 2        | A                     | 1                             | R                | T               | -                    | -              | -                  | -                    |  |
| 232805              | Welsh Road, Offchurch           | 56  | 46       | 71/74   | 64                                 | 52       | 62      | 64  | 53       | 1      | 1        | A                     | 1                             | R                | T               | -                    | -              | -                  | -                    |  |
| 232831              | Leamington Road, Ufton          | 53  | 44       | 68/71   | 41                                 | 33       | 38      | 54  | 44       | 12     | 12       | A                     | 2                             | R                | T               | L                    | -              | -                  | ~                    |  |
| 232863              | Welsh Road West, Bascote        | 48  | 39       | 63/66   | 43                                 | 35       | 42      | 49  | 40       | 6      | 6        | NA                    | 1                             | R                | T               | -                    | -              | -                  | #                    |  |
| 233010              | Bascote, Southam                | 49  | 40       | 63/66   | 49                                 | 37       | 47      | 52  | 41       | 3      | 5        | A                     | 1                             | R                | T               | -                    | -              | -                  | ~                    |  |
| 233039              | Bascote, Southam                | 52  | 43       | 68/71   | 49                                 | 37       | 47      | 54  | 44       | 5      | 7        | A                     | 1                             | R                | T               | -                    | -              | -                  | ~                    |  |
| 233106              | Southam Road, Ufton             | 36  | 29       | 49/52   | 46                                 | 36       | 49      | 46  | 37       | 0      | 0        | NA                    | 3                             | R                | T               | -                    | -              | -                  | -                    |  |
| 233194              | Southam                         | 48  | 38       | 63/66   | 46                                 | 36       | 49      | 48  | 38       | 2      | 2        | NA                    | 1                             | R                | T               | -                    | -              | -                  | -                    |  |
| 233308              | Featherbed Lane, Bascote Heath  | 41  | 34       | 54/57   | 46                                 | 43       | 52      | 47  | 43       | 1      | 0        | NA                    | 15                            | R                | T               | -                    | -              | -                  | -                    |  |
| 233618              | Bascote, Southam                | 44  | 35       | 61/64   | 43                                 | 35       | 42      | 47  | 38       | 4      | 3        | NA                    | 2                             | R                | T               | -                    | -              | -                  | #                    |  |
| 235951              | Long Itchington Road, Offchurch | 43  | 35       | 48/51   | 49                                 | 38       | 45      | 49  | 39       | 1      | 1        | NA                    | 2                             | R                | T               | -                    | -              | -                  | -                    |  |
| 236207              | Snowford, Long Itchington       | 42  | 34       | 53/56   | 49                                 | 38       | 45      | 49  | 39       | 1      | 1        | NA                    | 4                             | R                | T               | -                    | -              | -                  | -                    |  |
| 236543              | Wormleighton, Southam           | 43  | 34       | 55/58   | 50                                 | 37       | 51      | 51  | 39       | 1      | 2        | NA                    | 8                             | R                | T               | -                    | -              | -                  | -                    |  |
| 236568              | Wormleighton, Southam           | 43  | 34       | 54/57   | 50                                 | 37       | 51      | 51  | 38       | 1      | 1        | NA                    | 7                             | R                | T               | -                    | -              | -                  | -                    |  |
| 236676              | Wormleighton, Southam           | 40  | 31       | 51/54   | 55                                 | 37       | 61      | 56  | 38       | 0      | 1        | NA                    | 2                             | R                | T               | -                    | -              | -                  | -                    |  |
| 236736              | Ten Cottages, Wormleighton      | 42  | 33       | 53/56   | 60                                 | 49       | 37      | 60  | 49       | 0      | 0        | NA                    | 10                            | R                | T               | -                    | -              | -                  | -                    |  |
| 236813              | Wormleighton, Southam           | 39  | 30       | 50/53   | 55                                 | 37       | 61      | 55  | 38       | 0      | 1        | NA                    | 5                             | R                | T               | -                    | -              | -                  | -                    |  |
| 236844              | Wormleighton, Southam           | 39  | 30       | 48/51   | 52                                 | 37       | 61      | 53  | 37       | 0      | 0        | NA                    | 1                             | R                | T               | -                    | -              | -                  | -                    |  |
| 237438              | Ladbroke, Southam               | 40  | 31       | 52/55   | 59                                 | 56       | 65      | 59  | 56       | 0      | 0        | NA                    | 2                             | R                | T               | H                    | -              | -                  | -                    |  |
| 237620              | Ladbroke, Southam               | 41  | 32       | 52/55   | 53                                 | 50       | 53      | 54  | 50       | 0      | 0        | NA                    | 2                             | R                | T               | -                    | -              | -                  | -                    |  |

| Assessment Location |                             | Impact criteria                           |       |       |                                    |       |     |   |       |        |       | Significance criteria |                               |                  |                 |                      |                | Significant effect |                      |           |
|---------------------|-----------------------------|---|-------|-------|------------------------------------|-------|-----|---|-------|--------|-------|-----------------------|-------------------------------|------------------|-----------------|----------------------|----------------|--------------------|----------------------|-----------|
| ID                  | Area represented            | Proposed Scheme only<br>(Year 15 traffic) |       |       | Do nothing (Opening year baseline) |       |     | Do something<br>(Opening year baseline + Year 15 traffic + adjustments) |       | Change |       | Type of effect        | Number of impacts represented | Type of receptor | Receptor design | Existing environment | Unique feature | Combined impact    | Mitigation of effect |           |
|                     |                             | Day                                       | Night | Max   | Day                                | Night | Max | Day   | Night | Day    | Night |                       |                               |                  |                 |                      |                |                    |                      |           |
| 237700              | Ladbroke, Southam           | 40  | 31    | 51/54 | 54                                 | 51    | 55  | 55  | 51    | 0      | 0     | NA                    | 4                             | R                | T               | -                    | -              | -                  |                      |           |
| 237878              | School Lane, Ladbroke       | 40  | 31    | 52/55 | 56                                 | 38    | 61  | 57  | 39    | 0      | 1     | NA                    | 11                            | R                | T               | -                    | -              | -                  |                      |           |
| 237984              | Ladbroke, Southam           | 41  | 32    | 52/55 | 60                                 | 42    | 64  | 60  | 43    | 0      | 0     | NA                    | 16                            | R                | T               | -                    | -              | -                  |                      |           |
| 238088              | Banbury Road, Southam       | 49  | 41    | 60/63 | 40                                 | 35    | 49  | 49  | 41    | 9      | 6     | A                     | 1                             | R                | T               | L                    | -              | -                  | OSV16-Co1            |           |
| 238174              | Ladbroke, Southam           | 44  | 36    | 54/57 | 52                                 | 40    | 46  | 52  | 41    | 1      | 1     | NA                    | 1                             | R                | T               | -                    | -              | -                  |                      |           |
| 238218              | Windmill Lane, Ladbroke     | 45  | 36    | 56/59 | 55                                 | 46    | 47  | 56  | 47    | 0      | 0     | NA                    | 9                             | R                | T               | -                    | -              | -                  |                      |           |
| 238281              | Lower Farm, Long Itchington | 62  | 53    | 74/77 | 52                                 | 43    | 47  | 62  | 53    | 10     | 10    | A                     | 1                             | R                | T               | -                    | -              | -                  | OSV16-Co1            |           |
| 238331              | Banbury Road, Southam       | 57  | 48    | 68/71 | 60                                 | 51    | 62  | 61  | 53    | 1      | 2     | A                     | 1                             | R                | T               | -                    | -              | -                  |                      |           |
| 238388              | Hedges Close, Ladbroke      | 42  | 33    | 55/58 | 50                                 | 41    | 45  | 51  | 42    | 1      | 1     | NA                    | 23                            | R                | T               | -                    | -              | -                  |                      |           |
| 238540              | Radbourne Lane, Ladbroke    | 44  | 35    | 58/61 | 49                                 | 43    | 53  | 50  | 44    | 1      | 1     | NA                    | 3                             | R                | T               | -                    | -              | -                  |                      |           |
| 238586              | Radbourne Lane, Ladbroke    | 47  | 38    | 60/63 | 44                                 | 39    | 51  | 49  | 41    | 5      | 3     | NA                    | 1                             | R                | T               | -                    | -              | -                  | #                    |           |
| 238688              | Radbourne Lane, Ladbroke    | 52  | 42    | 63/67 | 42                                 | 37    | 47  | 52  | 43    | 10     | 7     | A                     | 2                             | R                | T               | L                    | -              | -                  | ~                    |           |
| 238783              | Wormleighton, Southam       | 49  | 40    | 63/66 | 42                                 | 40    | 49  | 50  | 43    | 8      | 3     | A                     | 3                             | R                | T               | L                    | -              | -                  | ~                    |           |
| 238819              | Wormleighton, Southam       | 46  | 37    | 60/63 | 56                                 | 52    | 54  | 56  | 52    | 0      | 0     | NA                    | 2                             | R                | T               | -                    | -              | -                  |                      |           |
| 238896              | Lower Radbourne, Southam    | 54  | 44    | 71/74 | 40                                 | 38    | 45  | 54  | 45    | 14     | 7     | A                     | 1                             | R                | T               | L                    | -              | -                  | ~                    |           |
| 238957              | Ladbroke, Southam           | 48  | 39    | 61/64 | 42                                 | 34    | 43  | 49  | 40    | 8      | 6     | NA                    | 1                             | R                | T               | L                    | -              | -                  | #                    |           |
| 239026              | Lower Radbourne, Southam    | 65  | 56    | 83/86 | 40                                 | 38    | 39  | 65  | 56    | 25     | 17    | S                     | 1                             | R                | T               | L                    | -              | -                  | NI                   | OSV16-Do1 |
| 239092              | Upper Radbourne, Southam    | 42  | 33    | 54/57 | 42                                 | 34    | 43  | 45  | 36    | 3      | 2     | NA                    | 3                             | R                | T               | L                    | -              | -                  | #                    |           |
| 239286              | Windmill Lane, Ladbroke     | 57  | 48    | 69/73 | 42                                 | 34    | 43  | 58  | 48    | 16     | 14    | A                     | 2                             | R                | T               | L                    | -              | -                  | ~                    |           |
| 239591              | Banbury Road, Southam       | 49  | 41    | 60/63 | 57                                 | 49    | 69  | 57  | 49    | 1      | 1     | A                     | 1                             | R                | T               | -                    | -              | -                  |                      |           |
| 239943              | Banbury Road, Southam       | 60  | 51    | 73/76 | 60                                 | 51    | 57  | 61  | 51    | 1      | 0     | A                     | 1                             | R                | T               | -                    | -              | -                  |                      |           |
| 240376              | Beech Close, Southam        | 44  | 35    | 57/60 | 49                                 | 39    | 50  | 50  | 40    | 1      | 1     | NA                    | 34                            | R                | T               | -                    | -              | -                  |                      |           |
| 240604              | Station Road, Southam       | 49  | 41    | 60/63 | 49                                 | 47    | 55  | 51  | 47    | 2      | 1     | A                     | 1                             | R                | T               | -                    | -              | -                  |                      |           |
| 240636              | Station Road, Southam       | 69  | 59    | 83/86 | 65                                 | 61    | 76  | 69  | 62    | 4      | 2     | S                     | 1                             | R                | T               | H                    | -              | -                  | NI                   | OSV16-Do2 |

| Assessment Location |                             | Impact criteria                           |       |       |                                    |       |     |   |       |        |       | Significance criteria |                               |                  |                 |                      |                | Significant effect |                      |  |
|---------------------|-----------------------------|---|-------|-------|------------------------------------|-------|-----|---|-------|--------|-------|-----------------------|-------------------------------|------------------|-----------------|----------------------|----------------|--------------------|----------------------|--|
| ID                  | Area represented            | Proposed Scheme only<br>(Year 15 traffic) |       |       | Do nothing (Opening year baseline) |       |     | Do something<br>(Opening year baseline + Year 15 traffic + adjustments) |       | Change |       | Type of effect        | Number of impacts represented | Type of receptor | Receptor design | Existing environment | Unique feature | Combined impact    | Mitigation of effect |  |
|                     |                             | Day                                       | Night | Max   | Day                                | Night | Max | Day   | Night | Day    | Night |                       |                               |                  |                 |                      |                |                    |                      |  |
| 240670              | Kineton Road, Southam       | 59  | 50    | 71/74 | 50                                 | 46    | 71  | 60  | 51    | 10     | 6     | A                     | 2                             | R                | T               | -                    | -              | -                  | ~                    |  |
| 240744              | Lemmington Road, Southam    | 66  | 57    | 80/83 | 56                                 | 46    | 59  | 66  | 57    | 11     | 11    | S                     | 1                             | R                | T               | -                    | -              | -                  | NI OSV16-D03         |  |
| 240763              | Warwick Road, Southam       | 49  | 40    | 61/64 | 57                                 | 53    | 59  | 58  | 53    | 1      | 0     | A                     | 21                            | R                | T               | -                    | -              | -                  |                      |  |
| 240780              | Southam                     | 56  | 47    | 72/75 | 55                                 | 51    | 62  | 59  | 52    | 4      | 2     | A                     | 1                             | R                | T               | -                    | -              | -                  | ~                    |  |
| 240879              | Lower Farm, Long Itchington | 49  | 40    | 66/69 | 46                                 | 38    | 46  | 50  | 41    | 4      | 4     | A                     | 1                             | R                | T               | -                    | -              | -                  | ~                    |  |
| 241272              | Banbury Road, Southam       | 56  | 49    | 64/67 | 50                                 | 45    | 53  | 56  | 49    | 6      | 4     | A                     | 4                             | R                | T               | -                    | -              | -                  | OSV16-C01            |  |
| 241737              | Kineton Road, Southam       | 43  | 34    | 56/59 | 54                                 | 45    | 53  | 54  | 45    | 0      | 0     | NA                    | 10                            | R                | T               | -                    | -              | -                  |                      |  |
| 241800              | Hurst Road, Southam         | 46  | 37    | 57/60 | 56                                 | 46    | 59  | 56  | 47    | 0      | 0     | NA                    | 20                            | R                | T               | -                    | -              | -                  |                      |  |
| 242117              | Old Road, Southam           | 47  | 39    | 59/62 | 63                                 | 61    | 70  | 63  | 61    | 0      | 0     | NA                    | 12                            | R                | T               | H                    | -              | -                  | -                    |  |
| 242240              | Elm Close, Southam          | 41  | 32    | 52/55 | 49                                 | 39    | 50  | 49  | 40    | 1      | 1     | NA                    | 35                            | R                | T               | -                    | -              | -                  |                      |  |
| 242487              | Old Road, Southam           | 47  | 38    | 59/62 | 53                                 | 51    | 60  | 54  | 51    | 1      | 0     | NA                    | 23                            | R                | T               | -                    | -              | -                  |                      |  |
| 242550              | Banbury Road, Southam       | 41  | 33    | 55/58 | 49                                 | 39    | 50  | 49  | 40    | 1      | 1     | NA                    | 29                            | R                | T               | -                    | -              | -                  |                      |  |
| 242627              | Abbey Lane, Southam         | 42  | 33    | 55/58 | 49                                 | 39    | 50  | 49  | 40    | 1      | 1     | NA                    | 30                            | R                | T               | -                    | -              | -                  |                      |  |
| 242672              | Abbey Lane, Southam         | 41  | 32    | 54/57 | 49                                 | 39    | 50  | 49  | 40    | 1      | 1     | NA                    | 15                            | R                | T               | -                    | -              | -                  |                      |  |
| 243035              | Banbury Road, Southam       | 42  | 33    | 56/59 | 40                                 | 39    | 48  | 44  | 40    | 4      | 1     | NA                    | 18                            | R                | T               | L                    | -              | -                  | #                    |  |
| 243268              | Stowe Drive, Southam        | 42  | 34    | 55/58 | 40                                 | 39    | 48  | 44  | 40    | 5      | 1     | NA                    | 42                            | R                | T               | L                    | -              | -                  | #                    |  |
| 243335              | Stowe Drive, Southam        | 44  | 35    | 57/60 | 53                                 | 52    | 56  | 53  | 52    | 1      | 0     | NA                    | 21                            | R                | T               | -                    | -              | -                  |                      |  |
| 244191              | Warwick Road, Southam       | 40  | 31    | 51/54 | 64                                 | 55    | 63  | 64  | 55    | 0      | 0     | NA                    | 24                            | R                | T               | H                    | -              | -                  | -                    |  |
| 244339              | Warwick Road, Southam       | 45  | 36    | 57/60 | 57                                 | 48    | 53  | 57  | 48    | 0      | 0     | NA                    | 10                            | R                | T               | -                    | -              | -                  |                      |  |
| 244689              | Holywell Road, Southam      | 44  | 36    | 58/61 | 46                                 | 38    | 52  | 48  | 40    | 2      | 2     | NA                    | 23                            | R                | T               | -                    | -              | -                  |                      |  |
| 245867              | Warwick Road, Southam       | 45  | 36    | 58/61 | 51                                 | 41    | 54  | 52  | 42    | 1      | 1     | NA                    | 18                            | R                | T               | -                    | -              | -                  |                      |  |
| 245913              | Warwick Road, Southam       | 47  | 38    | 59/62 | 56                                 | 46    | 59  | 56  | 47    | 1      | 1     | NA                    | 10                            | R                | T               | -                    | -              | -                  |                      |  |
| 246028              | Banbury Road, Southam       | 48  | 39    | 60/63 | 65                                 | 57    | 74  | 65  | 57    | 0      | 0     | NA                    | 10                            | R                | T               | H                    | -              | -                  | -                    |  |
| 248022              | Welsh Road East, Southam    | 45  | 36    | 56/59 | 44                                 | 36    | 43  | 47  | 39    | 3      | 3     | NA                    | 1                             | R                | T               | -                    | -              | -                  | #                    |  |

| Assessment Location |   |   | Impact criteria |       |                                    |       |     |   |       |        |       |                | Significance criteria         |                  |                 |                      |                |                 | Significant effect   |  |
|---------------------|---|---|-----------------|-------|------------------------------------|-------|-----|---|-------|--------|-------|----------------|-------------------------------|------------------|-----------------|----------------------|----------------|-----------------|----------------------|--|
| ID                  | Area represented                                    | Proposed Scheme only<br>(Year 15 traffic) |                 |       | Do nothing (Opening year baseline) |       |     | Do something<br>(Opening year baseline + Year 15 traffic + adjustments) |       | Change |       | Type of effect | Number of impacts represented | Type of receptor | Receptor design | Existing environment | Unique feature | Combined impact | Mitigation of effect |  |
|                     |   | Day                                       | Night           | Max   | Day                                | Night | Max | Day   | Night | Day    | Night |                |                               |                  |                 |                      |                |                 |                      |  |
| 253286              | Priors Hardwick, Southam                            | 43  | 34              | 59/62 | 51                                 | 28    | 61  | 52  | 34    | 1      | 7     | NA             | 1                             | R                | T               | L                    | -              | -               | #                    |  |
| 700442              | Wormleighton, Southam                               | 40  | 30              | 51/54 | 35                                 | 17    | 41  | 41  | 30    | 5      | 14    | NA             | 1                             | R                | T               | L                    | -              | -               | #                    |  |
| 901028              | Radstone Ironside Fringe A                          | 55  | 46              | 69/72 | 38                                 | 36    | 41  | 55  | 46    | 17     | 10    | -              | -                             | LD               | -               | L                    | -              | -               |                      |  |
| 901029              | Radstone Ironside Fringe B                          | 63  | 53              | 78/81 | 40                                 | 38    | 39  | 63  | 54    | 23     | 15    | -              | -                             | LD               | -               | L                    | -              | -               |                      |  |
| 901030              | Radstone Ironside Fringe C                          | 58  | 49              | 77/80 | 55                                 | 51    | 46  | 60  | 53    | 5      | 2     | -              | -                             | LD               | -               | -                    | -              | -               |                      |  |
| 901031              | Radstone Ironside Fringe D                          | 44  | 35              | 59/62 | 59                                 | 55    | 54  | 59  | 55    | 0      | 0     | -              | -                             | LD               | -               | H                    | -              | -               |                      |  |
| 901032              | Lady Hill   | 47  | 38              | 59/62 | 42                                 | 34    | 43  | 48  | 39    | 7      | 5     | -              | -                             | LD               | -               | L                    | -              | -               |                      |  |
| 901033              | Ufton Vale Farmlands A                              | 66  | 57              | 84/87 | 44                                 | 32    | 42  | 66  | 57    | 23     | 25    | -              | -                             | LD               | -               | L                    | -              | -               |                      |  |
| 901035              | Ufton Vale Farmlands B                              | 52  | 43              | 67/70 | 30                                 | 22    | 29  | 52  | 43    | 22     | 21    | -              | -                             | LD               | -               | L                    | -              | -               |                      |  |
| 232831              | Wood Farm, Leamington Road (General Commercial)     | 53  | 44              | 68/71 | 41                                 | 33    | 38  | 54  | 44    | 12     | 12    | B              | 1                             | G5               | T               | L                    | -              | -               | -                    |  |
| 233308              | Featherbed Lane, Bascote Heath (General Commercial) | 41  | 34              | 54/57 | 46                                 | 43    | 52  | 47  | 43    | 1      | 0     | B              | 2                             | G3               | T               | -                    | -              | -               | -                    |  |
| 236543              | St. Peter's Church, Wormleighton, (Church)          | 43  | 34              | 55/58 | 50                                 | 37    | 51  | 51  | 39    | 1      | 2     | B              | 1                             | G3               | T               | -                    | -              | -               | -                    |  |
| 236568              | Wormleighton (General Commercial)                   | 43  | 34              | 54/57 | 50                                 | 37    | 51  | 51  | 38    | 1      | 1     | B              | 1                             | G5               | T               | -                    | -              | -               | -                    |  |
| 236813              | Hall, Wormleighton (Hall)                           | 39  | 30              | 50/53 | 55                                 | 37    | 61  | 55  | 38    | 0      | 1     | B              | 1                             | G3               | T               | -                    | -              | -               | -                    |  |
| 237620              | Ladbroke Farm, Ladbroke (General Commercial)        | 41  | 32              | 52/55 | 53                                 | 50    | 53  | 54  | 50    | 0      | 0     | B              | 2                             | G3               | T               | -                    | -              | -               | -                    |  |
| 237878              | Poultry Farm, Ladbroke, (Engineering Works)         | 40  | 31              | 52/55 | 56                                 | 38    | 61  | 57  | 39    | 0      | 1     | B              | 1                             | G5               | T               | -                    | -              | -               | -                    |  |
| 238088              | Starbold Farm, Banbury Road (General Commercial)    | 49  | 41              | 60/63 | 40                                 | 35    | 49  | 49  | 41    | 9      | 6     | B              | 1                             | G5               | T               | L                    | -              | -               | \$                   |  |
| 238174              | Ladbroke House, Ladbroke (Office)                   | 44  | 36              | 54/57 | 52                                 | 40    | 46  | 52  | 41    | 1      | 1     | B              | 1                             | G5               | T               | -                    | -              | -               | -                    |  |

| Assessment Location |   |   | Impact criteria |         |                                    |          |         |   |          |        |          |                | Significance criteria         |                  |                 |                      |                |                 | Significant effect   |  |
|---------------------|---|---|-----------------|---------|------------------------------------|----------|---------|---|----------|--------|----------|----------------|-------------------------------|------------------|-----------------|----------------------|----------------|-----------------|----------------------|--|
| ID                  | Area represented  | Proposed Scheme only<br>(Year 15 traffic) |                 |         | Do nothing (Opening year baseline) |          |         | Do something<br>(Opening year baseline + Year 15 traffic + adjustments) |          | Change |          | Type of effect | Number of impacts represented | Type of receptor | Receptor design | Existing environment | Unique feature | Combined impact | Mitigation of effect |  |
|                     |   | Day                                       | Night           | Max *** | Day *                              | Night ** | Max *** | Day *   | Night ** | Day *  | Night ** |                |                               |                  |                 |                      |                |                 |                      |  |
| 240161              | Holywell Business Park, Northfield Road (Office)                    | 53  | 44              | 64/67   | 51                                 | 41       | 54      | 55  | 46       | 4      | 5        | A              | 1                             | G5               | T               | -                    | -              | -               | \$                   |  |
| 240604              | Fields Farm, Station Road, Southam, (Office)                        | 49  | 41              | 60/63   | 49                                 | 47       | 55      | 51  | 47       | 2      | 1        | B              | 1                             | G5               | T               | -                    | -              | -               | -                    |  |
| 240879              | Stoney Thorpe Hall, Southam, (Hall)                                 | 49  | 40              | 66/69   | 46                                 | 38       | 46      | 50  | 41       | 4      | 4        | B              | 1                             | G3               | T               | -                    | -              | -               | \$                   |  |
| 241232              | Avondale Veterinary Centre, (Veterinary Surgery)                    | 63  | 55              | 72/75   | 62                                 | 61       | 76      | 64  | 61       | 2      | 0        | B              | 2                             | G5               | T               | H                    | -              | -               | -                    |  |
| 241232              | Kineton Road Industrial Estate (General Commercial)                 | 63  | 55              | 72/75   | 62                                 | 61       | 76      | 64  | 61       | 2      | 0        | B              | 19                            | G5               | T               | H                    | -              | -               | -                    |  |
| 241232              | South Warwickshire Business Park (General Commercial)               | 63  | 55              | 72/75   | 62                                 | 61       | 76      | 64  | 61       | 2      | 0        | B              | 1                             | G5               | T               | H                    | -              | -               | -                    |  |
| 241232              | Kineton Road Industrial Estate (General Commercial)                 | 63  | 55              | 72/75   | 62                                 | 61       | 76      | 64  | 61       | 2      | 0        | B              | 1                             | G5               | T               | H                    | -              | -               | -                    |  |
| 241232              | The Cobalt Centre, Kineton Road (General Commercial)                | 63  | 55              | 72/75   | 62                                 | 61       | 76      | 64  | 61       | 2      | 0        | B              | 3                             | G5               | T               | H                    | -              | -               | -                    |  |
| 241232              | Westfield Road, Kineton Road Industrial Estate (General Commercial) | 63  | 55              | 72/75   | 62                                 | 61       | 76      | 64  | 61       | 2      | 0        | B              | 3                             | G5               | T               | H                    | -              | -               | -                    |  |
| 241411              | Avon House, Kineton Road (General Commercial)                       | 55  | 47              | 64/67   | 57                                 | 56       | 71      | 59  | 56       | 2      | 1        | B              | 1                             | G5               | T               | H                    | -              | -               | -                    |  |
| 241411              | Bourne End, Kineton Road Industrial Estate (General Commercial)     | 55  | 47              | 64/67   | 57                                 | 56       | 71      | 59  | 56       | 2      | 1        | B              | 5                             | G5               | T               | H                    | -              | -               | -                    |  |
| 241411              | Butlin House, Kineton Road Industrial Estate (General Commercial)   | 55  | 47              | 64/67   | 57                                 | 56       | 71      | 59  | 56       | 2      | 1        | B              | 1                             | G5               | T               | H                    | -              | -               | -                    |  |
| 241411              | Cromwell House, Kineton   | 55  | 47              | 64/67   | 57                                 | 56       | 71      | 59  | 56       | 2      | 1        | B              | 1                             | G5               | T               | H                    | -              | -               | -                    |  |

| Assessment Location |  | Impact criteria                           |             |            |                                    |             |            |   |             |          |             |                |                               | Significance criteria |                 |                      |                |                 |                      | Significant effect |
|---------------------|--|---|-------------|------------|------------------------------------|-------------|------------|---|-------------|----------|-------------|----------------|-------------------------------|-----------------------|-----------------|----------------------|----------------|-----------------|----------------------|--------------------|
| ID                  | Area represented   | Proposed Scheme only<br>(Year 15 traffic) |             |            | Do nothing (Opening year baseline) |             |            | Do something<br>(Opening year baseline + Year 15 traffic + adjustments) |             | Change   |             | Type of effect | Number of impacts represented | Type of receptor      | Receptor design | Existing environment | Unique feature | Combined impact | Mitigation of effect |                    |
|                     |  | Day<br>*                                  | Night<br>** | Max<br>*** | Day<br>*                           | Night<br>** | Max<br>*** | Day<br>*  | Night<br>** | Day<br>* | Night<br>** |                |                               |                       |                 |                      |                |                 |                      |                    |
|                     | Road Industrial Estate, (Office)                                     |   |             |            |                                    |             |            |   |             |          |             |                |                               |                       |                 |                      |                |                 |                      |                    |
| 241411              | Gainsborough Trading Estate, Southam (General Commercial)            | 55  | 47          | 64/67      | 57                                 | 56          | 71         | 59  | 56          | 2        | 1           | B              | 5                             | G5                    | T               | H                    | -              | -               | -                    |                    |
| 241411              | Holywell Business Park, Southam (General Commercial)                 | 55  | 47          | 64/67      | 57                                 | 56          | 71         | 59  | 56          | 2        | 1           | B              | 6                             | G5                    | T               | H                    | -              | -               | -                    |                    |
| 241411              | Kineton Road, Southam (General Commercial)                           | 55  | 47          | 64/67      | 57                                 | 56          | 71         | 59  | 56          | 2        | 1           | B              | 1                             | G5                    | T               | H                    | -              | -               | -                    |                    |
| 241411              | Northfield Road, Kineton Road Industrial Estate (General Commercial) | 55  | 47          | 64/67      | 57                                 | 56          | 71         | 59  | 56          | 2        | 1           | B              | 3                             | G5                    | T               | H                    | -              | -               | -                    |                    |
| 241411              | Rhodes House, Kineton Road Industrial Estate (General Commercial)    | 55  | 47          | 64/67      | 57                                 | 56          | 71         | 59  | 56          | 2        | 1           | B              | 1                             | G5                    | T               | H                    | -              | -               | -                    |                    |
| 241411              | Westfield Road, Kineton Road Industrial Estate (General Commercial)  | 55  | 47          | 64/67      | 57                                 | 56          | 71         | 59  | 56          | 2        | 1           | B              | 8                             | G5                    | T               | -                    | -              | -               | -                    |                    |
| 244191              | Warwick Road, Southam (General Commercial)                           | 40  | 31          | 51/54      | 64                                 | 55          | 63         | 64  | 55          | 0        | 0           | B              | 1                             | G5                    | T               | -                    | -              | -               | -                    |                    |
| 244689              | Air Training Corps, Wattons Lane, Southam (Military Youth Club)      | 44  | 36          | 58/61      | 46                                 | 38          | 52         | 48  | 40          | 2        | 2           | B              | 1                             | G3                    | T               | -                    | -              | -               | -                    |                    |
| 248022              | Larkfield House, Welsh Road East, Southam, (Office)                  | 45  | 36          | 56/59      | 44                                 | 36          | 43         | 47  | 39          | 3        | 3           | B              | 1                             | G5                    | T               | -                    | -              | -               | \$                   |                    |
| 700625              | Northfield Road, Kineton Road Industrial Estate, (Shopping)          | 48  | 39          | 60/63      | 56                                 | 46          | 59         | 56  | 47          | 1        | 1           | B              | 3                             | G5                    | T               | -                    | -              | -               | -                    |                    |

| Assessment Location |  |   | Impact criteria |       |                                    |       |     |   |       |        |       |                | Significance criteria         |                  |                 |                      |                | Significant effect |                      |
|---------------------|--|---|-----------------|-------|------------------------------------|-------|-----|---|-------|--------|-------|----------------|-------------------------------|------------------|-----------------|----------------------|----------------|--------------------|----------------------|
| ID                  | Area represented   | Proposed Scheme only<br>(Year 15 traffic) |                 |       | Do nothing (Opening year baseline) |       |     | Do something<br>(Opening year baseline + Year 15 traffic + adjustments) |       | Change |       | Type of effect | Number of impacts represented | Type of receptor | Receptor design | Existing environment | Unique feature | Combined impact    | Mitigation of effect |
|                     |  | Day                                       | Night           | Max   | Day                                | Night | Max | Day   | Night | Day    | Night |                |                               |                  |                 |                      |                |                    |                      |
| 700625              | Northfield Road, Kineton Road Industrial Estate, (Surgery) | 48  | 39              | 60/63 | 56                                 | 46    | 59  | 56  | 47    | 1      | 1     | B              | 1                             | G4               | T               | -                    | -              | -                  |                      |
| 700625              | V M C House, Northfield Road (General Commercial)          | 48  | 39              | 60/63 | 56                                 | 46    | 59  | 56  | 47    | 1      | 1     | B              | 1                             | G5               | T               | -                    | -              | -                  |                      |
| 700625              | Wandfluh House, Northfield Road (General Commercial)       | 48  | 39              | 60/63 | 56                                 | 46    | 59  | 56  | 47    | 1      | 1     | B              | 1                             | G5               | T               | -                    | -              | -                  |                      |
| 700634              | Warwick House Industrial Estate (General Commercial)       | 58  | 49              | 65/68 | 60                                 | 52    | 69  | 61  | 52    | 1      | 1     | B              | 12                            | G5               | T               | -                    | -              | -                  |                      |
| 700635              | Banbury Road, Southam, (Office)                            | 42  | 33              | 53/56 | 60                                 | 52    | 69  | 60  | 52    | 0      | 0     | B              | 1                             | G5               | T               | -                    | -              | -                  |                      |

### *Direct impact - Summary*

4.3.7 The operational airborne noise impacts identified in Table 1 are summarised in Table 2.

Table 4: Summary of operational airborne noise impacts

| Receptor                   | Number of impacts |          |       |
|----------------------------|-------------------|----------|-------|
|                            | Minor             | Moderate | Major |
| Residential properties     | 3                 | 10       | 12    |
| Non-residential properties | 0                 | 0        | 0     |
| Quiet areas                | None              | None     | None  |

## 4.4 Assessment of impacts and effects

### **Residential receptors: direct effects - individual buildings**

#### *Surface sections of route - airborne noise and ground-borne vibration*

4.4.2 Taking account of the avoidance and mitigation measures incorporated into the Proposed Scheme, the assessment has identified three residential dwellings, close to the Proposed Scheme, where noise would exceed the daytime trigger threshold set in the Regulations. It is therefore estimated that these buildings are likely to qualify for noise insulation under the Regulations. These dwellings are indicated on Volume 5: Map Book – Sound, noise and vibration, Map series SV-02:

- Chapel Bank, Lower Radbourne, receptor reference 239026 (marked as OSV16-D01 in Table 3);
- Field Cottage, B4451 Kineton Road, Southam , receptor reference 240636 (marked as OSV16-D02 in Table 3); and
- Stoneythorpe Lodge, Southam, receptor reference 240744 (marked as OSV16-D03 in Table 3)

4.4.3 The mitigation measures, including noise insulation, will reduce noise inside all dwellings such that it will not reach a level where it would significantly affect residents.

#### *Tunnelled sections of route - ground-borne noise and vibration*

4.4.4 Significant ground-borne noise or vibration effects will be avoided or reduced through the design of the track and track-bed. Resilient materials will be used between the rails and the track-bed to protect nearby receptors from operational ground-borne noise and vibration.

4.4.5 Tunnel portals will be designed to avoid any significant airborne noise effects caused by the trains entering the tunnel.

## Residential receptors: direct effects –communities

- 4.4.6 The avoidance and mitigation measures in this area will avoid adverse airborne noise effects within the following community areas:
- Southam (except as mentioned in Table 5);
  - Ladbroke;
  - Ufton;
  - Wormleighton; and
  - Bascote Heath.
- 4.4.7 Taking account of the envisaged mitigation, Map Series SV-02 (Volume 5 Map book) shows the long term 40dB<sup>2</sup> night-time sound level contour from the operation of trains on the Proposed Scheme. The extent of the 40dB night-time sound level contour is equivalent to, or slightly larger than, the 50dB daytime contour<sup>3</sup>. In general, below these levels adverse effects are not expected.
- 4.4.8 Above 40dB during the night and 50dB during the day the effect of noise is dependent on the baseline sound levels in that area and the change in sound level (magnitude of effect) brought about by the Proposed Scheme. The airborne noise impacts and effects forecast for the operation of the scheme are presented on Map Series SV-02 (Volume 5 Map Book).
- 4.4.9 The changes in noise levels are likely to affect the acoustic character of the area such that there is a perceived change in the quality of life and are considered to be significant when assessed on a community basis taking account of the local context.
- 4.4.10 Approximately 20 isolated properties within the area have been identified as being subject to an observed adverse noise effect; these effects are likely to be considered as an effect on the acoustic character of the area such that there is a perceived change in the quality of life. However, as the affected properties are spatially remote from larger defined residential areas, are subject to smaller magnitudes of noise effect, or are small in number, the effects are not considered to be significant.
- 4.4.11 The direct adverse effects on the areas of the residential communities identified in Table 5 are considered to be significant.

Table 5: Direct adverse effects on residential communities and shared areas that are considered significant on a community basis

| Significant effect number (see Map series SV-02 and Table 1 and 3) | Source of significant effect                    | Time of day            | Location and details   |
|--|---|------------------------|--|
| OSV16-C01  | Airborne noise increase from new train services | Daytime and night-time | Five dwellings in the vicinity of Starbold Farm, and A423 Banbury Road. Forecast increases in sound from the railway are likely to cause a major to moderate adverse effect on the acoustic character of the area around the closest properties. No adverse effects on shared open spaces have been identified |

<sup>2</sup> Defined as the equivalent continuous sound level from 23:00 to 07:00 or  $L_{pAeq,night}$ .

<sup>3</sup> With the train flows described in the assumptions section of this report, the daytime sound level (defined as the equivalent continuous sound level from 07:00 to 23:00 or  $L_{pAeq,day}$ ) from the Proposed Scheme would be approximately 10dB higher than the night-time sound level. The 40dB contour therefore indicates the distance from the Proposed Scheme at which the daytime sound level would be 50dB.

## Residential receptors: indirect effects

- 4.4.12 The transport assessment presented in Volume 5: Appendix TR-001-ooo, has been used to identify those roads or railways within this study area where the alignment remains as at present, but a change in flow or composition is identified which is greater than the screening criteria defined in Volume 5: Appendix SV-001-ooo. No roads or railways which exceed the criteria defined in Volume 5: Appendix SV-001-ooo have been identified in this study area.
- 4.4.13 The assessment of operational noise and vibration indicates that significant indirect effects on residential receptors are unlikely to occur in this area.

## Non-residential receptors: direct effects

- 4.4.14 The assessment of operational noise and vibration indicates that significant direct effects on non-residential receptors are unlikely to occur in this area.

## Non-residential receptors: indirect effects

- 4.4.15 The transport assessment presented in Volume 5: Appendix TR-001-ooo, has been used to identify those roads or railways within this study area where the alignment remains as at present, but a change in flow or composition is identified which is greater than the screening criteria defined in Volume 5: Appendix SV-001-ooo. No roads or railways which exceed the criteria defined in Volume 5: Appendix SV-001-ooo have been identified in this study area.
- 4.4.16 The assessment of operational noise and vibration indicates that significant indirect effects are unlikely to occur on non-residential receptors in this area.

## Cumulative effects

- 4.4.17 Details of properties being currently developed which were afforded planning approval before the safeguarding date are presented in Volume 5: Appendix CToo4-ooo. Within this area, the operational sound, noise or vibration associated with these developments in conjunction with the operation of the Proposed Scheme do not result in any significant cumulative effects.